

JSC Policy Directive

JPD 8719.1

EFFECTIVE DATE: 4/10/03

EXPIRATION DATE: Valid Until Rescinded

RESPONSIBLE OFFICE: JA/Center Operations Directorate

SUBJECT: JSC Material Handling Policy

1. POLICY

1.a. To meet or exceed Federal and NASA standards concerning material handling and lifting operations.

1.b. This policy is the Center's implementation of NASA-STD-8719.9, dated May 9, 2002, titled "Standard for Lifting Devices and Equipment," Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI) requirements, as well as accepted industrial material handling and lifting practices. The primary purpose of this policy is to define procedures and processes by which JSC and its component facilities may, under specific conditions and through the implementation of specific controls, conduct critical lifting operations utilizing lifting devices and equipment that may not be fully compliant with requirements outlined in NASA STD-8719.9.

1.c. All material lifting and handling operations performed at JSC and its component facilities which include Ellington Field (EF) and the Sonny Carter Training Facility (SCTF) at Houston, Texas; White Sands Test Facility (WSTF), New Mexico; and the Air Force Plant 42, Site 1 at Palmdale, California; must meet the following:

1.c(1) OSHA, ANSI, and accepted industry material handling or lifting practices, as well as lifting equipment manufacturers' requirements.

1.c(2) NASA-STD-8719.9 (current version), Standard for Lifting Devices and Equipment.

1.c(3) JSC Procedures and Guidelines (JPG) 1700.1(current version), "JSC Safety and Health Handbook."

1.c(4) Attachment, "JSC Process for Critical Lift Operations Not Conforming to NASA-STD. 8719.9."

2. APPLICABILITY

2.a. This policy applies to all material handling and lifting operations that occur at JSC, EF, SCTF, WSTF, and the JSC west coast industrial plant at Palmdale, California. This policy applies to contractor locations when specifically imposed by contract requirements. If not so imposed by contract requirements, then the need to comply with this policy shall be evaluated and made a contractual requirement where deemed necessary by the Contracting Officer and the responsible NASA installation/program office.

2.b. This policy includes, but shall not be limited to, all critical or non-critical lifts that occur on or in Government facilities, construction sites, operational areas, or storage areas where Government or contractor employees perform material lifting and handling in support of NASA/JSC operations. This policy applies to overhead bridge cranes, hoists, mobile cranes, forklifts, personnel lifts, scissor lifts, and vehicle-mounted personnel or material lifting equipment, as well as supporting load bearing equipment such as structural slings, shackles, etc. This policy applies to all NASA-owned and NASA contractor-supplied equipment used in support of NASA operations.

3. AUTHORITY. The authority for this policy is NASA-STD-8719.9 (current version), the OSHA Act of 1970, part 5(a)(1), "General Duty Standard," Code of Federal Regulations 29 CFR 1910.5, "Occupational Safety and Health Standards for General Industry," and 29 CFR 1926, "Occupational Safety and Health Standards for the Construction Industry," applicable ANSI documents, as well as the equipment manufacturers' operating and maintenance requirements.

4. REFERENCES

4.a. NASA-STD-8719.9 (current version), "Standard for Lifting Devices and Equipment."

4.b. 29 CFR 1910, "Occupational Safety and Health Standards for General Industry."

4.c. 29 CFR 1910.5(a)(1), "General Duty Standard."

4.d. 29 CFR 1926, "Occupational Safety and Health Standards for the Construction Industry."

4.e. Applicable American National Standard Institute (ANSI) documents, as listed in NASA-STD-8719.9 (current version) "Standard For Lifting Devices and Equipment."

4.f. Applicable Crane Manufacturers Association of America (CMAA) documents, as listed in NASA-STD-8719.9 (current version) "Standard For Lifting Devices and Equipment."

4.g. The equipment manufacturers' operating and maintenance instructions.

4.h. The following chapters of JSC 1700.1 (current version), "JSC Safety and Health Handbook:"

- (1) Chapter 1.4, "Standards for Safety, Health, and Environmental Protection"
- (2) Chapter 5.8, "Hazardous Operations: Safety Practices and Certifications"
- (3) Chapter 8.5, "Lifting Equipment and Lifting Operations"

4.i. JSC 17773, "Instructions for Preparation of a Hazard Analysis for JSC Ground Operations."

5. DEFINITIONS

5.a. **Critical lift**, as defined by NASA-STD-8719.9 (current version): A lift where failure/loss of control could result in loss of life, loss of or damage to flight hardware, or a lift involving special, high dollar items, such as spacecraft, one-of-a-kind articles, or major facility components, whose loss would have serious programmatic or institutional impact. Critical lifts also include the lifting of personnel with a crane, lifts where personnel are required to work under a suspended load, and operations with special personnel and equipment safety concerns beyond normal lifting hazards.

5.a(1) **Critical Lift (routine)** shall be defined as a critical lift that is repeated on a planned or scheduled frequency using an approved standard operating procedure or process. Standard operating procedures or processes for routine critical lifts shall include a Critical Lift Plan and Hazard Analysis.

5.b. **Non-critical lift**, as defined by NASA-STD-8719.9 (current version). A lift involving routine lifting operations governed by standard industry rules and practices except as supplemented with unique NASA testing, operations, maintenance, inspection, and personnel licensing requirements contained in this standard. For purposes of further defining lifts associated with flight-related hardware, the following would typically be considered non-critical lifts:

- (1) Lifting of flight hardware contained in its transportation packaging. Exceptions may be made on a case-by-case basis only if the installation LDE Manager, program/project management, and other support staff, including the cognizant safety organization, determine the lift is critical.
- (2) Lifting of raw materials and basic hardware such as nuts, bolts, brackets, and piece parts.

5.c. Rated Load, Safe Working Load, or Rated Capacity - An assigned weight that is the maximum load the device or equipment shall operationally handle and maintain. This value is marked on the device indicating maximum working capacity. This is also the load referred to as "safe working load" or "working load limit." If the device has never been down-rated or up-rated, this is also the "manufacturer's rated load."

5.d. Proof Load - The specific load or weight applied in performance of a proof load test. This load is typically greater than the rated load.

5.e. Proof Load Test - A test performed prior to first use, after major modification to any component within the load path, or at other prescribed times. This test verifies material strength, construction, and workmanship and typically uses a load greater than the rated load. A "proof load test," as defined and used in the NASA Standard, is essentially equivalent to the OSHA rated load test, which allows for test loads to exceed the rated load by up to 25 percent.

5.f. Lifting Devices and Equipment (LDE) - Devices such as overhead and gantry cranes (including top running monorail, under-hung, and jib cranes), mobile cranes, derricks, hoists, winches, special hoist supported personnel lifting devices, hydra-sets, load measuring devices, hooks, slings and rigging, mobile aerial platforms, powered industrial trucks, and jacks used for lifting and lowering.

5.g. Certification - That condition under which the maintenance, testing, or other operational checks for a particular lifting device or associated equipment have been properly performed and are current.

5.h. Certified Operator - An individual who has met all proficiency requirements for operating cranes or lifting devices, and has demonstrated that proficiency by passing a standard written examination, proved operational knowledge and skills, or has produced sufficient proof or documentation issued by external authorities to so demonstrate appropriate proficiency in the operation of those lifting devices and equipment for which certification is sought. Operators tested and certified by NASA to perform Critical Lifts must also meet certain physical requirements, as determined by a limited physical examination defined by the JSC Occupational Medicine and Test Support Office. Typically, such examinations shall be required every 3 years for personnel younger than 40 years of age and annually for those 40 or older. However, the Occupational Medicine and Test Support Office may modify these criteria at its discretion, or as need warrants.

5.i. Lift Manager - The individual appointed by each directorate or program office to be that organization's single point of contact for critical crane operations within a designated facility or group of facilities. Lift Managers (or functional equivalent) can be either NASA or contractor personnel and shall be responsible for all aspects of coordinating, planning, and executing a Critical Lift within that

assigned facility. When circumstances prevent the direct involvement of the facility's designated Lift Manager, that Lift Manager may delegate the responsibility for critical lift oversight to another equally trained and qualified individual. The Lift Manager (or delegated individual) shall coordinate with both the hardware owner and Safety personnel in the development of required Hazard Analyses, shall coordinate Pre-Lift Meetings and formal Checklist reviews, and shall ensure that critical lift operations within their facilities comply with this Policy, as well as the NASA Standard (STD-8719.9). Although not necessarily certified to operate a particular crane or lifting device, each Lift Manager (or delegated alternate) shall be fully trained in lift process management, as well as the unique characteristics and emergency procedures associated with the crane(s) and lifting devices within his/her purview. Under no circumstances should a Lift Manager also function as the Certified Operator performing a Critical Lift. The term Lift Manager defines the functional responsibilities outlined above. An existing alternate title, such as the "Critical Lift Engineer" utilized by WSTF, is acceptable if functionally equivalent.

5.j. **Facility Manager** - The single point of contact responsible for ensuring the general safety of a building and its occupants. The Facility Manager is charged with the authority for ensuring the proper coordination and safe conduct of all activities taking place in or around their assigned facility, such as testing, operations, construction, modification, repairs, or maintenance.

5.k. **Variance** - Documented and approved permission to perform some act contrary to established requirements. (Must be approved by Center Director).

5.l. **Waiver** - A variance that authorizes departure from a specific safety requirement where a special level of risk has been documented and accepted.

5.m. **Deviation** - A variance that authorizes departure from a particular requirement that does not strictly apply, or where the intent of the requirement is being met through alternate means that provides an equivalent level of safety with no additional risk.

6. REQUIREMENTS

6.a. Each of the JSC facilities at Houston, Texas; White Sands Test Facility, New Mexico; and the JSC west coast industrial plant at Palmdale, California; are responsible for:

6.a(1) Assignment of a NASA civil service employee as the single point of contact (POC) for the implementation of this JSC Material Handling Policy.

6.a(2) Developing material lifting and handling processes or procedures to comply with this policy.

6.a(3) Performing maintenance on all Government-owned facility fixed material lifting and handling equipment. A complete maintenance history for each piece of fixed lifting and handling equipment shall be maintained in a Computerized Maintenance Management System (CMMS), or other electronic format or system, the contents of which can be readily accessed and adapted to such a CMMS.

6.a(4) Performing maintenance on all Government-owned and contractor operated mobile material lifting and handling equipment used at the facility. A complete maintenance history for each piece of mobile lifting and handling equipment shall be maintained in a CMMS or similar database.

6.a(5) Inspecting, testing, and certifying all Government-owned material lifting and handling equipment, as required by NASA standards.

6.a(6) Testing and certifying all operators of Government-owned material lifting and handling equipment. This should include the development and maintenance of historical records for all personnel trained and certified as operators of such Government-owned equipment.

6.a(7) Providing material lifting and handling support for NASA programs when requested by site organizations. The descriptions and definitions contained in the attached "[JSC Form No. JF 941](#)" should be used as a guide for determining the criticality of a lift, as well as for coordinating and planning lifting operations. A Critical Lift requires coordination with the requester to develop a Hazard Analysis, a detailed formal Lift Plan, as well as the completion of either the attached [JSC Form No. JF 941](#) or a fully equivalent alternate. Non-critical lifts can vary greatly in their complexity and relative importance. A very simple non-critical lift may be performed by a qualified, certified operator. However, when cognizant management or safety personnel determine that a specific lift warrants increased levels of safety or oversight, they may, at their discretion, require the preparation of a similar detailed material lifting and handling plan and/or the completion of the attached [JSC Form No. JF 941](#) (or equivalent).

6.a(8) Ensuring that critical and non-routine material lifting and handling operations that are conducted in or around a building are coordinated with, and schedule notification provided to, the affected area Facility Manager, the functional equivalent (WSTF and Palmdale), or his/her designee.

6.a(9) Developing and maintaining a database of all Government-owned material lifting and handling equipment and associated lifting components. This database shall, as a minimum, identify equipment location, equipment type, manufacturer, model number, serial number, proof certification date, recertification due date, critical or non-critical lift capability, and known discrepancies associated with the equipment. This shall include ensuring that all newly purchased lifting and

handling equipment is formally proof load tested and the equipment data is entered into the database.

6.a(10) Documenting and maintaining historical files for each critical lift. Such Critical Lift files shall include a detailed lift plan (reference attached "[JSC Form No. JF 941](#)"), hazard analysis, certification documentation for both lifting equipment and associated lifting components, operator certification documentation, approval documentation from the applicable Safety organization, Lift Manager, Facility Manager (or designated equivalent), and waiver/deviation approval for any identified safety or procedural requirement that is not being met during the lift. For installations or organizations performing numerous Critical Lifts, where the physical compilation of such files for each lift is not practical, a reference to the location of operator and equipment records will suffice. A new Critical Lift package is not required for each routine critical lift (see 5.A.1), but accountability is required each time that the Critical Lift standard operating procedure or process is used. The attached "JSC Process for Critical Lift Operations Not Conforming to NASA-STD 8719.9" must be followed if all of the design requirements for critical lifts, as specified within NASA-STD-8719.9 (current version), are not met. In such cases, an appropriate deviation and waiver package shall be prepared according to Chapter 1.4, Section 7 of JPG 1700.1 "Safety and Health Handbook" (current version) and approved by authority identified in this document.

6.a(11) Ensuring that non-NASA owned material lifting and handling equipment or devices, used by Contractors performing lifting operations in support of NASA functions, comply with OSHA inspection and certification requirements, and the equipment operators are certified as the qualified/designated operator by their employer. Material lifting in support of NASA critical lift operations must meet the requirements of this policy.

7. RESPONSIBILITY

7.a. Center Operations Directorate (JA) at Johnson Space Center, Houston, Texas, is responsible for:

7.a(1) Reviewing and updating this policy, as required.

7.a(2) Assigning a JA civil service employee as the LDE Manager for JSC, as well as the liaison to NASA Headquarters regarding the JSC implementation of the NASA Standard for Lifting Devices and Equipment (NASA STD-8719.9).

7.a(3) Performing maintenance on all Government-owned facility fixed material lifting and handling equipment at JSC, EF, and SCTF.

7.a(4) Performing maintenance on specified Government-owned mobile material lifting and handling equipment used at JSC, EF, and SCTF, as requested by other directorates and/or program offices using that equipment.

7.a(5) Inspecting, testing, and certifying Government-owned material lifting and handling equipment at JSC, EF, and SCTF.

7.a(6) Testing and certifying operators of Government-owned material lifting and handling equipment located at JSC, EF, and SCTF.

7.a(7) Developing and maintaining a database of all personnel who have been certified for operations involving Government-owned material lifting and handling equipment at JSC, EF, and SCTF.

7.a(8) Providing material lifting and handling support for NASA programs when requested by JSC organizations. This shall include coordinating with the requester, as well as the associated Lift Manager, when applicable, in the development of a detailed material lifting and handling plan and providing assistance, as is practical and pertinent, to those individuals in the development of their hazard analysis of the lifting or handling process.

7.a(9) Ensuring that all material lifting and handling operations to be completed by JA are properly coordinated and scheduled and that prior notification is made to the affected JSC, EF, or SCTF Facility Manager or his/her designee. Critical Lifts shall also be coordinated with the pertinent Lift Manager, when applicable.

7.b. The Safety, Reliability, and Quality Assurance Office (NA) of the Johnson Space Center at Houston, Texas, is responsible for:

7.b(1) Reviewing this material lifting and handling policy and assuring compliance with its direction and intent by all applicable parties and entities.

7.b(2) Performing annual metrics review to support policy compliance verification.

7.b(3) Reviewing and approving procedures, processes, lifting plans, and hazard analyses for critical lifts at JSC, EF, and SCTF. Routine critical lift procedures shall be reviewed the first time that the procedure is written and only thereafter when changes are made.

7.b(4) Verifying that non-NASA owned material lifting and handling equipment or devices, used by contractors performing critical material handling operations and/or critical lifting operations in support of NASA functions, comply with OSHA inspection and certification requirements, and the equipment operators are certified as the qualified/designated operator by their employer. Non-critical material handling and/or lifting operations will be addressed on a case-by-case basis, at the discretion of NA.

7.b(5) Assuring that periodic audits are performed on each directorate's, program office's, or installation's Government-owned LDE database, as well as their operator certification records, for compliance with this Policy.

7.c. Directorates, program offices, and JSC field installations that operate Government-owned material lifting and handling equipment, or use contractors to perform this function, are responsible for:

7.c(1) Selecting a NASA civil service employee as the single POC for their organization, with responsibility for the management of the overall material lifting and handling program for their organization.

7.c(2) Developing internal material lifting and handling processes and procedures to comply with this policy.

7.c(3) Appointing Lift Managers (or functional equivalent) for each directorate or program facility or group of facilities, and ensuring that such individuals are properly trained to coordinate and manage critical lifting operations within those assigned facilities.

7.c(4) Developing and maintaining a database of all Government-owned material lifting and handling equipment and associated lifting components purchased and used internally by the directorates, program offices, or field installations. This database shall identify equipment location, equipment type, manufacturer, model number, serial number, proof certification date, recertification due date, critical or non-critical lift capability, and discrepancies associated with the equipment. Any such organizationally maintained database is not required to contain lifting and handling equipment already tracked in the JA lifting and handling equipment database. Equipment currently tracked by JA would typically encompass fixed facility cranes and hoists at JSC, EF, and SCTF, as well as other ancillary LDE typically utilized by JA or its contractors. Similar facility cranes and hoists at WSTF and Palmdale, as well as test-specific, load-specific, or function-specific fixtures, slings, or similar devices or equipment are generally the responsibility of the directorate, program office, or field installation utilizing such LDE. Each organization shall ensure that all newly purchased lifting and handling equipment is formally proof tested and the equipment data is entered either into their organization's database, or into the JA material lifting and handling equipment database, if appropriate.

7.c(5) Documenting and maintaining historical files for each critical lift. Such critical lift files shall include a lift plan, hazard analysis, certification records for lifting equipment and associated components, operator certification records, documented approval from the appropriate safety officials and Lift Manager, pertinent Facility Manager approval documentation, as well as waiver/deviation

approval for any identified safety or procedural requirement that is not being met during the lift. For installations or organizations performing numerous Critical

Lifts, where the physical compilation of such files for each lift is not practical, a reference to the location of operator and equipment records will suffice. The attached "[JSC Form No. JF 941](#)" (or fully functional equivalent) should be utilized when preparing a Lift Plan. Also, the attached "JSC Process for Critical Lift Operations Not Conforming to NASA STD 8719.9" must be followed if all of the requirements of that Standard are not met. A new critical lift package is not required for each routine critical lift but accountability is required each time that the Critical Lift standard operating procedure or process is used.

7.c(6) Providing timely and sufficient information to the Safety, Reliability, and Quality Assurance Office (NA) and other support organizations for non-routine critical lifts. Advance lift notice is required to ensure proper review of procedures, processes, lift plan, hazard analysis approval, etc. When requesting material lifting and handling support from another organization, the information shall include lift classification (critical or non-critical), all lifting considerations related to the item being handled (special attachment points, special instructions or constraints, weight, load shift potentials, center of gravity, load characteristics, travel path clearances, weather constraints, etc.) or other operational concerns.

7.c(7) For those facilities performing daily Critical Lifts, or operating over multiple shifts, the cognizant Lift Manager may impose minor real-time changes to a specific Critical Lift package. When this occurs, both that Lift Manager and the responsible directorate or program manager must mutually agree to a Memorandum of Agreement (MOA). Such an MOA will document the scope of the changes and become part of the Critical Lift file.

8. METRICS. The Safety, Reliability, and Quality Assurance Office (NA) of the Johnson Space Center shall develop annual policy compliance verification metrics, which shall include the number of non-routine critical lifts, critical lift waivers, lifting process Close Call reports, and reported lifting process incidents/mishaps.

9. RESCISSION. This JPD rescinds JPD 1740.1, "JSC Material Handling Policy" dated October 21, 1998. Subject classification number changed. Title and text changes not annotated.

10. ATTACHMENTS:

“JSC Process for Critical Lift Operations Not Conforming to NASA-STD 8719.9”

[“JSC Form No. JF 941”](#)

<Original signed by Jefferson D. Howell, Jr. 4/10/03>

Jefferson D. Howell, Jr.
Director

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